

Amendments to the drawings:

The attached two sheets of drawings include changes to Figs. 2 and 4. These sheets, which include Figs. 1-4, replace the original drawing sheets which included Figs. 1-4.

Attachments: Replacements Sheets 1/3 and 2/3  
Annotated Sheets 1/3 and 2/3

## REMARKS

The applicant appreciates the Examiner's thorough examination of the Application and requests reexamination and reconsideration of the Application in view of the following remarks.

The Examiner has indicated that claims 6 and 7 would be allowable if rewritten in independent form. Applicant herein adds new claims 13 and 14 in response. Applicant would like to thank the Examiner for the indication of allowable subject matter. Applicant has also amended the claim dependency in claim 7 to correct a typographical error.

The Examiner has requested corrected drawings for Figs. 2 and 4. Applicant herein attaches two replacement sheets of drawings, as well as two sheets of annotated drawings, to correct minor typographical errors with Figs. 2 and 4.

Claims 1-5 and 8-12 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,567,218 to Dedic et al.

The subject invention results from the realization that an improved  $2^n-1$  shuffling network which reduces the effect of mismatch errors and reduces autocorrelation and concomitant colored or harmonic noise can be achieved using a replacement set of  $2^n-1$  data switches for receiving  $2^n-1$  outputs from a shuffle exchange network. The shuffle exchange network receives  $2^n-1$  inputs and a dummy input and provides  $2^n$  outputs. Selective ones of the data switches in the replacement set are actuated to replace one of the  $2^n-1$  outputs of the shuffle exchange network with the  $2^{\text{nth}}$  output of the shuffle exchange network.

Dedic relates to noise shaping in mixed signal circuitry, such as in digital-to-analog (DAC) converters. Fig. 5 of Dedic et al., which the Examiner cites, shows binary-thermometer decoder 6 that provides outputs IT1-ITn to segment rotation section 22, which is shown in greater detail in Fig. 10 of Dedic et al. Segment rotation section 22 includes three multiplexers 62, 64 and 55 which are respectively controlled by control signals  $b_1$ ,  $b_2$  and  $b_3$  (collectively referred to

as the  $r$  value). In Fig. 10,  $n$  signals are both input and output from each of multiplexers 62, 64 and 66 of segment rotation section 22. Dedic et al. refers to these  $n$  output signals as  $2^m$  thermometer-coded signals.

Dedic et al. suggests at column 20, lines 1-18 that  $2^m$  different values can be represented by  $2^m-1$  thermometer-coded signals, in which case a “dummy” thermometer coded signal can be applied to segment rotation section 22. Dedic et al. merely conclude, however, that “[t]his effectively means that, in any given conversion cycle, there is always one segment whose state is not determined by the binary input word but is in a predetermined state.” Dedic et al., however, provides no solution to this problem associated with the prior art.

The subject invention also realized this problem with the prior art wherein the subject application states: “arbitrarily picking [the input]  $H$  as the redundant or dummy input, one can see that in each of the outputs  $S-Y$  in Fig. 3, through the sequence of codes 1-8, the input  $H$  appears but the input  $H$  is a dummy so no information is contributed by that input”. See the subject application at page 6, lines 9-12. However, whereas Dedic et al. merely stops after realizing a problem with the prior art, the subject invention provides a clever and effective solution to it.

In contrast to Dedic et al., the subject invention provides a  $2^n-1$  shuffling network 26b, Fig. 4, which can be implemented so that there are  $2^n-1$  inputs and  $2^n-1$  outputs. In  $2^n-1$  shuffling network 26b, shuffle exchange network 40b still includes  $n$  sets 42b, 44b, and 46b of  $2^n$  data switches 48 in each set. But now instead of input  $H$ , dummy input 70 occurs and a replacement set 72 of data switches 76 has been added at the output of set 46b. And a selection circuit 74 has been added to individually control each of the  $2^n-1$  data switches 76 in set 72. See the subject application at page 6, line 21 to page 7, line 3. Dedic et al. fails to teach, disclose or suggest such

a replacement set of data switches or selection circuit for a  $2^n-1$  shuffling network, as claimed by Applicant.

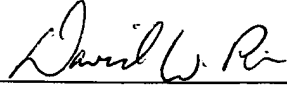
Claim 1 of the subject application recites: “[a]  $2^n-1$  shuffling network comprising: a shuffle exchange network for receiving  $2^n-1$  data inputs and a dummy input and providing  $2^n$  outputs; a replacement set of  $2^n-1$  data switches for receiving  $2^n-1$  outputs from said shuffle exchange network; and a selection circuit for actuating selective ones of said  $2^n-1$  data switches in said replacement set to replace one of the  $2^n-1$  outputs of the shuffle exchange network with the  $2^{\text{nth}}$  output of the shuffle exchange network.” (Emphasis added.) As noted above, Dedic et al. fails to teach, disclose or suggest a replacement set of  $2^n-1$  data switches for receiving  $2^n-1$  outputs from said shuffle exchange network, or a selection circuit for actuating selective ones of said  $2^n-1$  data switches in said replacement set to replace one of the  $2^n-1$  outputs of the shuffle exchange network with the  $2^{\text{nth}}$  output of the shuffle exchange network, as claimed by Applicant.

Accordingly, claims 1-12 are allowable over Dedic et al. Applicant respectfully requests that the Examiner withdraw the rejection of the claims under 35 U.S.C. §102(e).

Each of the Examining Attorney’s rejections has been addressed or traversed. Accordingly, it is respectfully submitted that the application is in condition for publication. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned, or his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

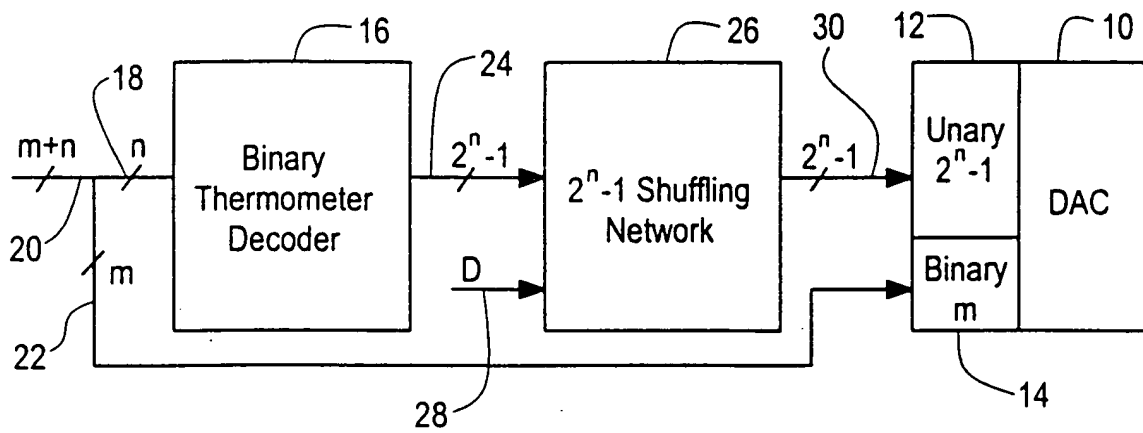
Respectfully submitted,

  
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David W. Poirier  
Reg. No. 43,007

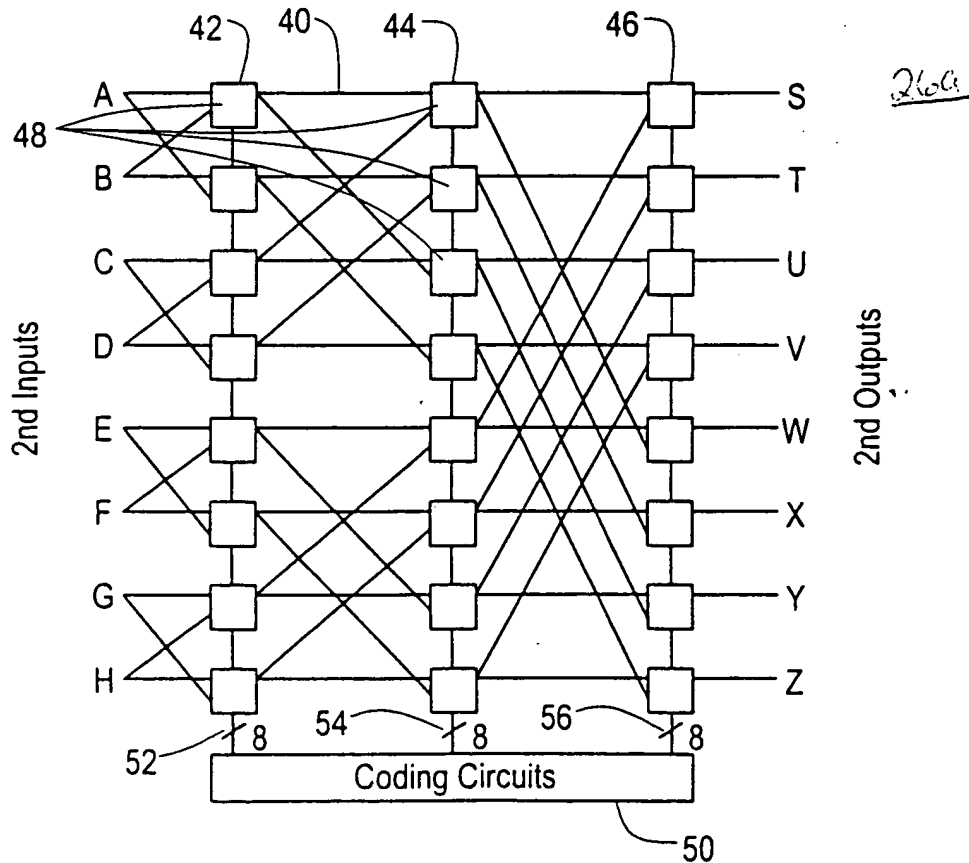


Applicant: William G.J. Schofield  
Title:  $2^n-1$  SHUFFLING NETWORK  
Serial No.: 09/990,316  
Docket No.: AD-294J  
Atty: David W. Poirier, Reg. No. 43,007  
ANNOTATED SHEET 1 of 3

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**FIG. 1**



**FIG. 2**



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 ANNOTATED SHEET 2 of 3

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$2^n$  Through Path Mapping Table 60

	Code			S	T	U	V	W	X	Y	Z
1	0	0	0	A	B	C	D	E	F	G	H
2	0	0	1	B	A	D	C	F	E	H	G
3	0	1	0	C	D	A	B	G	H	E	F
4	0	1	1	D	C	B	A	H	G	F	E
5	1	0	0	E	F	G	H	A	B	C	D
6	1	0	1	F	E	H	G	B	A	D	C
7	1	1	0	G	H	E	F	C	D	A	B
8	1	1	1	H	G	F	E	D	C	B	A

**FIG. 3**

